



UCSC

University of Colombo, Sri Lanka

University of Colombo School of Computing



**DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY
(EXTERNAL)**

Academic Year 2024— 1st Year Examination — Semester 2

IT2206 — Fundamentals of Software Engineering

Multiple Choice Question Paper
(2 Hours)

Important Instructions

- The duration of the paper is **2 Hours**.
- The medium of instructions and questions is English.
- This paper has **40 questions** on **08 pages**. Answer **all** questions.
- All questions are of the **MCQ** (Multiple Choice Questions) type.
- Each question will have **5 (five)** choices with **ONLY ONE** correct answer.
- This paper consists of 100 marks and all the questions will carry equal marks.
- Answers should be marked on the **special answer sheet** provided.
- Note that questions appear on both sides of the paper. If a page or part of a page is not printed, please inform the supervisor/invigilator immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**
- Any electronic device capable of storing and retrieving text, including electronic dictionaries, smartwatches, and mobile phones, is not allowed.
- Calculators are **not** allowed.
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1) Which of the following is an example of application software?

- (a) System utilities
- (b) Operating system
- (c) Graphic software
- (d) Program language translators
- (e) Performance monitors

2) Which one of the following is **NOT** considered a key feature of good software?

- | | | |
|-----------------------|-------------------|--------------|
| (a) Maintainability | (b) Efficiency | (c) Security |
| (d) Manufacturability | (e) Dependability | |

3) Consider the following statements regarding Web-based Systems.

- A. Service-oriented architecture is commonly used in web-based applications.
- B. Web-based systems often use software reuse by integrating pre-existing components.
- C. Technologies like AJAX and HTML5 help create rich user interfaces in web-based systems.

Which of the above statement(s) is/are **TRUE**?

- | | | |
|------------------|----------------|------------------|
| (a) A only | (b) C only | (c) A and B only |
| (d) B and C only | (e) A, B and C | |

4) Which of the following best describes the role of software specification?

- (a) It checks whether the software meets the customer's requirements.
- (b) It defines what the software should do.
- (c) It replaces all technical documentation.
- (d) It involves designing and programming software.
- (e) It involves modifying the software to reflect changing customer requirements.

5) Consider the following statements regarding hardware cost and software cost.

- A. Software costs more to maintain than to develop.
- B. Software and hardware have equal cost trends in modern systems.
- C. Hardware cost generally increases faster than software cost over time.

Which of the above statement(s) is/are **TRUE**?

- | | | |
|------------------|----------------|------------------|
| (a) A only | (b) B only | (c) A and B only |
| (d) B and C only | (e) A, B and C | |

6) Consider the following phases of the Waterfall Model.

- A. System and Software Design
- B. Integration and System Testing
- C. Requirements Analysis and Definition
- D. Operation and Maintenance
- E. Implementation and Unit Testing

Which of the following is **TRUE** based on the correct sequence of phases in the waterfall model?

- (a) C => E => A => B => D
- (b) E => C => B => D => A
- (c) C => A => E => B => D
- (d) C => A => B => E => D
- (e) E => A => B => D => C

7) Which one of the following statements is **TRUE** regarding incremental development?

- (a) Developed the software as a single end product.
- (b) Delivered the software only after all requirements were finalized.
- (c) Built and delivered the software in small parts based on priority.
- (d) Developed the software without customer involvement.
- (e) Only suitable for embedded systems.

8) Which of the following describes the validation process in software engineering?

- (a) Ensuring code is syntactically correct.
- (b) Checking if the software meets the customer's needs.
- (c) Checking whether the software meets the requirement specification.
- (d) Testing the hardware setup of the system.
- (e) Optimizing the performance of the software.

9) Which of the following is **NOT** a common benefit of software prototyping?

- (a) Improve usability
- (b) Closer match to user needs
- (c) Reduced testing effort
- (d) Improved maintainability
- (e) Better design quality

10) Which of the following is **NOT** an agile-based software development method?

- | | | |
|------------|-------------------------|----------|
| (a) Kanban | (b) Lean | (c) JIRA |
| (d) Scrum | (e) Extreme Programming | |

11) Which of the following statements is/are **TRUE** regarding Waterfall and Incremental models?

- A. The incremental model delays early delivery.
- B. The waterfall model is flexible and supports frequent updates.
- C. The incremental model may lead to a poor system structure over time.

- | | | |
|------------------|----------------|------------------|
| (a) A only | (b) C only | (c) A and B only |
| (d) A and C only | (e) A, B and C | |

12) Consider the following statements regarding sprint in Scrum.

- A. A long-term project phase involving product design.
- B. A document containing detailed system specifications.
- C. A fixed-length iteration where a potentially shippable product increment is developed.

Which of the above statement(s) is/are **NOT TRUE**?

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|------------------|------------------|------------|
| (a) A only | (b) B only | (c) C only |
| (d) A and B only | (e) B and C only | |

13) Which of the following statements is **TRUE** regarding test-first development?

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| (a) Writing tests before implementing code. |
| (b) Automating all test cases in advance. |
| (c) Letting users create test cases. |
| (d) Running tests once a week. |
| (e) Writing system tests before the requirement gathering process. |

14) Which of the following is **NOT** a core practice of Extreme Programming (XP)?

- | | | |
|----------------------|----------------------------|----------------------|
| (a) Pair Programming | (b) Continuous Integration | (c) On-site Customer |
| (d) Refactoring | (e) Sprint Planning | |

15) Consider the following statements regarding refactoring.

- A. Re-organization of a class hierarchy to remove duplicate code.
- B. Renaming attributes and methods to make them easier to understand.
- C. Adding a new feature that changes the system's behaviour.

Which of the above statement(s) is/are represent the example of refactoring?

- | | | |
|------------------|------------------|------------|
| (a) A only | (b) B only | (c) C only |
| (d) A and B only | (e) B and C only | |

16) Which of the following is a disadvantage of Extreme Programming?

- | | |
|-------------------------------|------------------------|
| (a) Built-In Quality | (b) Overall Simplicity |
| (c) Synergy Between Practices | (d) Customer Power |
| (e) No documentation | |

- 17) Which of the following is an example of a functional requirement?
- | | | | | |
|---|---|--|--|---|
| (a) The system shall be available 24/7. | (b) The system should respond within 2 seconds. | (c) The user shall be able to search the appointment list. | (d) The system should be portable across OS. | (e) The system shall comply with data privacy laws. |
|---|---|--|--|---|
- 18) Which one of the following is **NOT** a product-related non-functional requirement of a system?
- | | | |
|-------------------|-------------------------|-----------------|
| (a) Usability | (b) Security | (c) Reliability |
| (d) Dependability | (e) Operational Process | |
- 19) Which technique involves observing users as they perform tasks to gather requirements?
- | | | |
|-------------------|-----------------|------------------|
| (a) Ethnography | (b) Surveying | (c) Interviewing |
| (d) Brainstorming | (e) Prototyping | |
- 20) Which of the following statements is **NOT TRUE** regarding the key activities in the Requirements Engineering process?
- | | | | | |
|--|---|--|--|--|
| (a) Requirements elicitation and analysis involve discovering requirements by interacting with stakeholders. | (b) Requirements specification is the process of converting gathered requirements into a standard form. | (c) Requirements validation checks whether the requirements accurately define what the customer wants. | (d) Requirements validation is done after system deployment to ensure user satisfaction. | (e) Requirements Engineering is an iterative process where activities may overlap. |
|--|---|--|--|--|
- 21) A university is developing a Learning Management System (LMS). Students will use the system to access course materials and submit assignments. Lecturers will upload content and communicate with students. Administrators will manage user accounts, system settings, and monitor usage statistics.
- Which of the following lists the most appropriate set of actors for a use case diagram of this LMS?
- | | |
|--|---|
| (a) Lecturers, course content, servers | (b) Students, lecturers, administrators |
| (c) Assignments, grades, timetables | (d) Students and lecturers only |
| (e) Students, grading system, database | |
- 22) Which of the following statements is **TRUE** regarding aggregation and composition relationships in class diagrams?
- | | | | | |
|--|---|---|---|--|
| (a) Aggregation represents a stronger relationship than composition. | (b) Composition implies that a part class cannot exist without the whole class. | (c) Both aggregation and composition allow the parts to exist independently of the whole. | (d) The lifetime of the part is strictly bound to the lifetime of the whole in aggregation. | (e) Composition and aggregation are two names for the same relationship. |
|--|---|---|---|--|

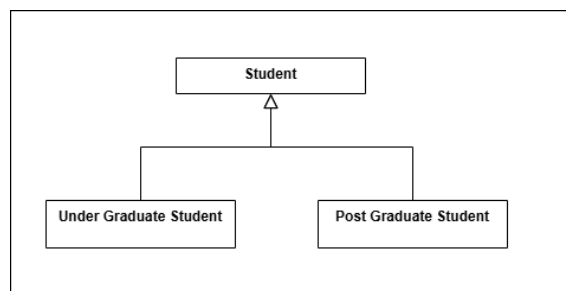
23) What type of system modeling perspective is used to model the system's environment or context?

- | | | |
|-----------------------------|-----------------------------|----------------------------|
| (a) External perspective | (b) Interaction perspective | (c) Structural perspective |
| (d) Environment Perspective | (e) Behavioral perspective | |

24) What does CIM stand for in Model-Driven Architecture (MDA)?

- | |
|------------------------------------|
| (a) Computation Independent Model |
| (b) Class Interaction Mechanism |
| (c) Communication Interface Module |
| (d) Code Interpretation Method |
| (e) Central Implementation Model |

25) Consider the following class diagram.



The relationship between the “Student” class and the “Under Graduate Student” class is a,

- | | | |
|-----------------|--------------------|-----------------|
| (a) Implication | (b) Aggregation | (c) Composition |
| (d) Dependency | (e) Generalization | |

26) What is the main disadvantage of repository architecture?

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|-----------------------------|----------------------|-------------------------|
| (a) Fast performance | (b) Low data sharing | (c) Supports modularity |
| (d) Single point of failure | (e) Easy scalability | |

27) What is a key benefit of layered architecture?

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| (a) It reduces the total number of components required in a system. |
| (b) It forces all layers to use the same programming language. |
| (c) It supports multi-level security. |
| (d) It eliminates the need for user interface design. |
| (e) It ensures the fastest possible system performance. |

28) Which view in the 4+1 view model shows the system hardware layout?

- | | | |
|------------------|-------------------|----------------------|
| (a) Logical view | (b) Process view | (c) Development view |
| (d) Use cases | (e) Physical view | |

29) Consider the following scenario related to a university learning platform.

A university launches a new web-based Learning Management System (LMS) that allows students to log in, access learning materials, submit assignments, and view their grades. Lecturers upload course content and mark submissions, while administrators manage user roles and platform settings. The system ensures a clear separation between the data layer, the user interface, and user interactions.

Which of the following is the most suitable architectural pattern for the above scenario?

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|-------------------------------|--------------------------------|----------------------|
| (a) Microservice architecture | (b) Repository architecture | (c) MVC architecture |
| (d) Pipe-filter architecture | (e) Client-server architecture | |

30) Which of the following is **NOT** a typical stage in the object-oriented design process?

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|--|---------------------------------------|
| (a) Identifying the principal system objects | (b) Designing the system architecture |
| (c) Specifying object interfaces | (d) Compiling the source code |
| (e) Defining system context | |

31) Which open-source license requires that any derived work must also be open source?

- | | |
|--|---------------------------------------|
| (a) Berkeley Standard Distribution License | (b) GNU Lesser General Public License |
| (c) GNU General Public License | (d) MIT License |
| (e) Apache License | |

32) Which of the following statements is **TRUE** regarding the abstraction level of software reuse?

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|---|
| (a) Reusing precompiled libraries in your code. |
| (b) Reusing a set of related objects as a component. |
| (c) Reusing entire application systems. |
| (d) Reusing software by copying and modifying source code. |
| (e) Reusing design knowledge and proven concepts without copying actual code. |

33) What is host-target development?

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| (a) The same platform for coding and executing the system. |
| (b) Developing the software on one machine and running it on another. |
| (c) Executing only on the Linux operating system. |
| (d) Running the system on virtual machines. |
| (e) Using the C language only for the programming of the system. |

34) Which of the following is the key assumption considered in partition testing in software testing?

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| (a) All inputs cause the same output. |
| (b) All inputs within a partition will behave similarly. |
| (c) Test cases must use boundary values only. |
| (d) Testing one partition is sufficient. |
| (e) Output data must match the partition size. |

- 35) Which of the following test types is primarily used to evaluate system stability under extreme load?
- | | | |
|--------------------|-------------------------|-------------------------|
| (a) User testing | (b) Regression testing | (c) Integration testing |
| (d) Stress testing | (e) Exploratory testing | |
- 36) Which of the following is a limitation of inspections compared to dynamic testing?
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| (a) They require the execution of code. |
| (b) They cannot detect defects from unexpected interactions. |
| (c) They are always done by end users. |
| (d) They cannot check inappropriate algorithms. |
| (e) They are only applicable to user interface elements. |
- 37) A developer fixes a bug in an invoicing system. However, after the update, the previously working features started malfunctioning. What type of testing should have been performed before the update?
- | | | |
|--------------------|-------------------------|------------------------|
| (a) Unit testing | (b) Load testing | (c) Regression testing |
| (d) Stress testing | (e) Performance testing | |
- 38) Which of the following is considered a ‘bad smell’ in code?
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|--------------------------------------|
| (a) Well-documented modules. |
| (b) Single-responsibility functions. |
| (c) Speculative generality. |
| (d) Optimized query. |
| (e) Unit tested components. |
- 39) Which of the following is **NOT** a valid strategy to evolve legacy systems?
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|--|
| (a) Scrap the system and modify business processes so that it is no longer required. |
| (b) Continue maintaining the system. |
| (c) Replace the system with a new system. |
| (d) Transform the system by re-engineering to improve maintainability. |
| (e) Outsource the legacy system to a third-party vendor. |
- 40) Which of the following is **NOT** a core activity performed during the software re-engineering process?
- | | |
|-----------------------------|-----------------------------------|
| (a) Source code translation | (b) Reverse engineering |
| (c) User interface redesign | (d) Program structure improvement |
| (e) Program Modularization | |
